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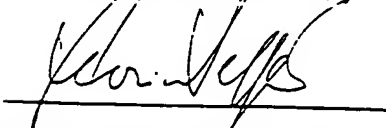
Re: Translation of German Patent, File Number PB11242USK, "Maschine zur Herstellung einer Faserstoffbahn aus einer Faserstoffsuspension sowie Verfahren und System zur Überwachung eines Entwässerungselementes", Taylor & Aust Ref. # VOI02230.US, from German into US English.

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Florian Deltgen, Ph.D., PD



Production Manager and Chief Translator

Apex Translations

Dated: April 2, 2002

Applicant:
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File: PB11242USK
"Rail Temperature"

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**Machine for Producing a Fibrous Web from a
Fibrous Suspension as well as a Process and System
for Monitoring a Drainage Element**

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The invention is a machine for manufacturing a fibrous web, in particular, a paper, cardboard, or tissue web, from a fibrous suspension, with a sheet forming area in which the developing fibrous web is led by means of at least one porous fabric, especially a mesh screen, over at least one suction box that consists of a main box that has at least one connection, including a line, to at least one vacuum source, and that consists of at least one suction box covering that is formed by at least two drainage elements, especially drainage rails, that run laterally to the machine's running direction, border a suction slit, and each of which consists of one main body and at least one ceramic, whereby preferably each of the at least one suction slits in both edge zones of the fabric is bordered by a format slide that consists of a main body and at least one ceramic.

15

20

The term sheet-forming unit includes both a former, for example, a twin-wire former or a hybrid former, as well as a wire section, especially a Fourdrinier wire part.

In addition, the invention is a process and a system for monitoring a paper machine's drainage element, which includes at least one ceramic.

This type of suction box is known, for example, from the applicant's German patent specification DE-PS 233 618 and European patent registration EP 0 831 173 A2 (PB10359 EP).

The absence or the presence of too little rinse water during the start up phase of the machine for manufacturing a fibrous web (especially a paper, cardboard, or tissue web) from a fibrous suspension can lead to overheating of the drainage elements. The resulting thermal load can be particularly damaging when thermal tensions arise in the ceramic, which could lead to a fracture in the ceramic, or when glued points between the ceramic and the main body soften, thereby creating the danger that the ceramic may slide or detach.

In general, there are two different possibilities that could lead to failure of a ceramic.

1. The adhesive remains stable and the ceramic breaks due to the direct thermal load on the ceramic.
2. The ceramic itself would withstand the thermal load, but the adhesive becomes soft and the small individual ceramic plate protrudes in one area progressively into the wire. This leads to a greater thermal load, resulting in fracture.

Of course, a combination of both cases may also occur.

For case 1, the temperature is measured close to the surface of the ceramic; for case 2,
the temperature is measured on the adhesive point.

Due to the constantly increasing machine speeds, even a short period of insufficient cooling, which can never be ruled out under practical operational conditions, could lead to destruction of the ceramic.

Although the article "Auswahlkriterien für Keramik-Beläge in schnelllaufenden Papiermaschinen unter Berücksichtigung ihres Einflusses auf die Konstanz der Siebpartie"; written by K.D. Fuchs and published in, among other publications, Wochenblatt für Papierfabrikation 23/24, 2000, (pages 1631 -1635, especially page 1633, left column) mentions simulation experiments with which thermal elements are used to measure the temperature on the lining surfaces in the wet section (sheet formation unit) and in the press section, the article deals primarily with the criteria for selecting ceramic coatings. Moreover, apparently temperature was measured only on the surface of the ceramic.

The purpose of the invention is therefore to create an improved machine of the previously mentioned type with which is ensured economical and reliable monitoring of the affected drainage elements and with which possible damage is avoided. Furthermore, the invention will enable simple and economical subsequent installation and exchange of temperature sensors on existing drainage elements.

According to the invention, a machine of the previously mentioned type accomplishes this task with at least one drainage element and/or

format slide that exhibits a removable edge piece inside which at least one temperature sensor is integrated.

5 These temperature sensors can be used to measure the temperature in the ceramic and/or the temperature at an adhesive point between the ceramic and the related main body and/or the temperature in the main body, thereby ensuring economical and reliable monitoring of the affected drainage elements and avoidance of potential damages.

10 The removable edge piece also creates the ideal condition both for simple and economical subsequent installation of a temperature measurement system as well as rapid and economical exchange of temperature sensors on existing drainage elements. There are two primary preferred temperature measurement positions:

15 In the first form, the temperature sensor is placed in the ceramic close to the ceramic surface, where the maximum temperature appears, and on any desired position above the section of the width of the drainage element that is wetted by the fabric.

20 The maximum temperature usually appears on edges, where the fabric contacts it or runs off. For this reason, temperature measurement without mechanical contact with the so-called "hot" spot (using infrared for example) is not practical.

For this reason, a second promising form involves arranging the temperature sensor in a recess in the ceramic. The recess in the ceramic is normally created before sintering (when the ceramic is still green). The advantage of this method of production is that it does not contribute to internal stresses in the ceramic or in

the area around the recess or opening. The recess can be created especially during a molding process.

5 A temperature measurement is generally practical in the machine's direction of operation only at the following locations:

- a) at the beginning and end of a drainage element, for example, at the first and last drainage rails of a suction box,
- b) especially where there is a high vacuum and/or a fabric guide with a rail or a lining,
- 10 c) in general anywhere there is a high specific pressure of the fabric on the ceramic and/or
- d) where there is insufficient lubrication caused by low drainage or the absence of spray water. Accordingly, a temperature sensor is planned for at least one of
- 15 the mentioned locations, as needed.

It is also advantageous when several temperature sensors are arranged laterally to the machine's running direction at an appropriate distance from each other. The distance between the measurement points can be approximately 500 mm, for example.

20 Thermocouples are the preferred temperature sensor type because they have historically demonstrated satisfactory price/performance, operational safety, and maintenance characteristics.

The preferred material for the main body of the drainage element is glass fiber-reinforced plastic. This type of material has proven its value in the paper industry.

From the perspective of costs and process technology, the ceramic of the drainage element and/or the format slide is shaped like a small ceramic plate and has a height of 1 mm to mm, preferably from 2 mm to 6 mm.

The format slide can be slid laterally relative to the machine's running direction in order to facilitate simple adjustment of the width of an individual suction zone and thereby the suction box's individual suction surface.

The format slide consists of either one part or several parts, each preferably with a constant height. Both variations of the format slide can be equipped with at least one height adjustment mechanism, whereby the preferred design of the height adjustment mechanism consists of at least one adjustment screw together with the accompanying locking screw.

In another (not depicted) version, height adjustment can be accomplished through mutual sliding of the format slide with the drainage element.

In order to avoid or reduce by the greatest degree possible damage and/or wear to the fabric running over the drainage element, the format slide has an extension that extends in the direction of the middle of the machine and preferably comes into contact with the fabric. In addition, the extension should be permeable for a fluid such as air or water.

When viewed from above, the extension is wedge-shaped and/or perforated to increase permeability for the fluid. The format slide can also exhibit a surface profile in contact with the fabric that is very similar to that of the drainage element.

According to a second aspect, the invention is based on the task of providing an improved process and an improved system, as described previously, with which is ensured economical and reliable monitoring of the affected drainage elements and with which possible damages are avoided.

According to the invention, this second task is accomplished with a process for monitoring a paper machine's drainage element, which includes at least one ceramic, with the following process steps:

- a) the temperature is measured in the ceramic, and/or on one adhesive point between the ceramic and a related main body, and/or in the main body,
- b) the obtained temperature measurement value is analyzed in a process control system related to the paper machine and is preferably compared with at least one selectable threshold value,
- c) depending on the result of the analysis or when the selectable threshold value is exceeded, the process control system automatically activates or influences as appropriate at least one control element in order to indicate that the threshold value has been exceeded and/or to initiate at least one appropriate countermeasure that will counteract further heating of the monitored area and/or cool the monitored area.

This design not only ensures automatic monitoring of the affected drainage element but also that countermeasures will be automatically initiated by a process control system upon reaching a critical temperature, for example, in order to prevent further generation of heat and therefore possible damage. In other words, process steps will be

automatically initiated as necessary in order to affect, for example, slow cooling of the ceramic material.

5

In addition, the design takes into account the fact that, with respect to thermal loads, there are in principle two critical locations on the ceramic, namely the adhesive point and the area of the ceramic close to the surface.

10

Considering the adhesive, the adhesive's softening point is lower than the temperatures that could lead to failure of the ceramic due to thermal stresses. Therefore, it is advantageous to monitor the temperature at the adhesive point. If the adhesive softens, the positions of the individual ceramic plates may become unstable. As a result, the pieces may fall further into the wire and thereby be subjected to higher thermal stresses, which could lead to failure. Furthermore, a change to the plate's location could cause increased wear to the wire and have negative effects on the formation of the paper or cardboard. The process according to the invention can counteract this.

15

According to a preferred design of the process according to the invention, temperature measurement is part of a control system that also includes signal conversion, which follows the measurement of temperature, as well as data processing performed by means of the process control system.

20

Regarding the ceramic surface, the temperature in the ceramic should be measured close to the surface of the ceramic, where the maximum temperature occurs.

25

5 The maximum temperature usually appears at edges where the wire contacts it or runs off. For this reason, temperature measurement without mechanical contact with the so-called "hot" spot (using infrared for example) is not practical. According to practical design of the process according to the invention, a recess is created in the ceramic, a temperature sensor is placed into the recess, and the temperature in the ceramic is measured by the temperature sensor in the recess. The recess in the ceramic is normally created before sintering (when the ceramic is still green). The advantage of this method of production according to the invention is that it does not contribute to internal stresses in the ceramic or in the area around the recess or opening. The recess can be created especially during a molding process.

15 Although the recess should be created when the ceramic is in the green state (before sintering), it is also possible to work the recess into the ceramic after the ceramic has been sintered.

It is advantageous for at least one of the following countermeasures to be initiated if a respective threshold value is exceeded:

- 20
- a) Reduction of the speed of the mesh screen, preferably to standstill;
 - b) particularly slow increase of the rinse water volume;
 - c) reduction of the vacuum on the drainage element.

To do so, at least one of the following steps, for example, can be initiated:

25 At least one spray tube, for example, can be appropriately influenced in order to change the spray water flow rate. To change the speed of the paper machine, at

least one of the paper machine's drives can be appropriately influenced. To reduce the vacuum on the drainage element, at least one valve can be appropriately adjusted. In addition, it is also possible, for example, to reduce the wire tension by appropriately adjusting at least one tension roller. If a threshold value is exceeded, an alarm signal, for example, can also be generated. The previously mentioned control elements can be, for example, spray tubes, paper machine drives, valves, tension rollers, signal emitters, and/or similar devices.

According to a functional design of the process according to the invention, first a warning signal is generated when an initial threshold value is exceeded and, when another threshold value is exceeded, at least one corresponding countermeasure is initiated with which further warming of the monitored area is counteracted and/or the monitored area is cooled.

A temperature measurement is generally practical in the machine's direction of operation only at the following locations:

- a) at the beginning and end of a drainage element, for example, at the first and last ceramic rail of a flat suction box;
- b) especially where there is a high vacuum and/or a wire guide with a rail or lining;
- c) in general, wherever the wire exhibits a specific high pressure on the ceramic and/or
- d) where there is insufficient lubrication caused by low drainage or the absence of spray water. Accordingly, a thermal sensor is planned for at least one of the mentioned locations, as needed.

It is also advantageous if the temperature is measured, viewed laterally to the machine's running direction, at several points separated from each other by an appropriate distance. Accordingly, the distance between the measurement points can be approximately 500 mm, for example.

A Thermocouple is the preferred temperature sensor.

Additional preferred designs of the process according to the invention are described in the sub claims.

The monitoring system according to the invention includes as appropriate at least one temperature sensor, connected to a process control system assigned to the paper machine, in order to measure the temperature in the ceramic and/or the temperature at an adhesive point between the ceramic and an assigned main body and/or the temperature in the main body, whereby the obtained temperature measurement value is analyzed in the process control system and preferably compared with at least one selectable threshold value and, depending on the result of the analysis or when the selectable threshold value is exceeded, the process control system can automatically appropriately activate or influence a control element in order to signal that the threshold value has been exceeded and/or initiate at least one appropriate countermeasure with which further warming of the monitored area is counteracted and/or the monitored area will be cooled.

Advantageous forms for implementing the monitoring system according to the invention are described in the sub claims.

It is clear that the invention's previously described characteristics and the characteristics to be described in the following can be used not only in the

indicated combination, but also in other combinations or individually without leaving the framework of the invention.

Additional characteristics and advantages of the invention are detailed in the sub claims and the following description of preferred examples of implementation, with reference to the drawing.

The following is shown

Figure 1: a schematic top view of the machine's suction box according to the invention;

Figures 2a and 3a: two schematic side views of the machine's format slide according to the invention;

Figures 2b and 3b: two perspective views of the machine's format slide according to the invention;

Figure 4: a second schematic top view of the machine's suction box according to the invention; and

Figures 5 and 6: two schematic side views of the machine's drainage element according to the invention (in profile).

Figure 1 shows a schematic top view of a suction box 6 of a machine 1 for manufacturing a fibrous web 2, especially a paper, cardboard, or tissue web, from a fibrous suspension 3 with a sheet formation area 4, whereby the suction box 6 is shown only in a cut-away view. In the sheet formation area 4, the developing fibrous web 2 is led by means of at least one porous fabric 5, especially a mesh screen 5.1, over at least one suction box 6 that consists of a main box 7 that has at least one connection 8, including a line 8.1, to at least one vacuum source 9, and that consists of at least one suction box covering 11 that is formed by at least two drainage elements 12, especially drainage rails 12.1, that run laterally to the machine's running direction L (arrow), border a suction slit 13, and each of

5 which consists of one main body 14 and at least one ceramic 15. Each of the at least one suction slits 13 is preferably bordered in both edge zones of the fabric by a format slide that consists of a main body 17 and at least one ceramic 18. According to the invention, it is now intended that at least one drainage element 12 and/or one format slide 16 exhibits at least one removable edge piece 12.2, 18.1, 18.2 in which at least one temperature sensor 19 is integrated in order to measure the temperature in the ceramic and/or the temperature at the adhesive point between the ceramic and the
10 related main body and/or the temperature in the main body. The edge piece 12.2, 18.1, 18.2 can be fastened to the main body 17 through the use of adhesive and/or clamps, several types of which have already been revealed. Regardless of the type of fastener, one hundred percent functional security must be ensured under all conditions.

15 It is further intended that, viewed from the machine's running direction L (arrow), at least one temperature sensor 19 be placed at the beginning and/or the end of the drainage element 12.

Furthermore, it is advantageous for the format slide 16 to be movable lateral to the machine's running direction L (arrow), indicated by a double-sided movement arrow. The movement can be accomplished manually by using a positive or non-positive
20 locking fastener, or electromechanically. However, several other movement and locking mechanisms that are well known among experts may be possible.

Also, a thermocouple, well known as such, is intended as the temperature sensor 19.

Figures 2a and 3a show two schematic side views of a format slide of the machine as described in the invention, whereas figures 2b and 3b show two perspective images of the same object.

According to the invention, the format slide 16 in figure 2a consists of a main body 17 and three removable edge pieces 18.1, 18.2, 18.3, whereby a temperature sensor 19.1, 19.2 is integrated into each of the edge pieces 18.1, 18.2. According to the invention, it is further intended that several temperature sensors 19.1, 19.2 are planned, arranged at a respective distance A from each other as viewed laterally to the machine's running direction L (arrow), whereby the distance A between the measurement points is about 500 mm. The at least one connection line 19.3 for the temperature sensors 19.1, 19.2 is shown with a dashed line.

Furthermore, the main body 17 of the format slide 16 (and/or the drainage element, which of course can also be a drainage element) consists of glass fiber reinforced plastic.

The ceramics 18.1, 18.2, 18.3 of the format slide 16 (and/or the drainage element) are in the shape of small ceramic plates 18.1, 18.2, 18.3 and exhibit a height H ranging from 1 mm to mm, preferably from 2 mm to 6 mm.

The format slide 16 of figure 2a is a one-piece object with a preferably constant height and is equipped with at least one height adjustment mechanism 20. The height adjustment mechanism 20 in the preferred version consists of at least one adjustment screw 20.1 with the accompanying locking screw 20.2.

Figure 2b shows a perspective view of the format slide 16 of figure 2a.

According to the invention, the format slide 16 in figure 3a also consists of a main body 17 and three removable edge pieces 18.1, 18.2, 18.3, whereby a temperature sensor 18.1 is integrated into the edge piece.

5 The format slide 16 of figure 3a is a multiple-piece object with a preferably constant height and is equipped with at least one height adjustment device in the form of at least one intermediate sheet 21.

Figure 3b shows a perspective view of the format slide 16 of figure 3a.

10 Figure 4 shows a second schematic top view of a suction box 6 of the machine 1 according to the invention. Regarding the general description of the suction box 6, reference is made to the description of the suction box 6 of figure 1. According to the invention it is now intended that the preferably movable format slide 16 exhibits an extension 22 that extends in the direction of the machine middle M (dashed line) and preferably comes into contact with the fabric. In addition, the extension is permeable
15 for a fluid such as air or water. The extension 22 is preferably wedge-shaped and/or perforated when viewed from above. The format slide (16) also exhibits a surface profile in contact with the fabric (5) that is very similar to that of the drainage element (12).

20 The drainage rails 12.1 depicted in figures 5 and 6 from a side view, each of which is assigned to a drainage element 12, each include a main body 14 and a ceramic 18 that is fastened to this with an adhesive point 23. One thermal element is assigned to each of the drainage rails 12.1 as a temperature sensor 19. Each thermal element can be
25 connected via a connection line 19.3 to a process control system 24, especially one that is assigned to the machine.

The temperature measurement at the drainage rail 12.1 depicted in figure 5 occurs on the adhesive point 23. The temperature sensor 19 is placed in a recess 25 provided in the main body 14, bordering the adhesive point 23.

The temperature measurement of the drainage rail 12.1 depicted in figure 6 occurs at the so-called "hot" ceramic zone, which is within the ceramic 18, close to the ceramic surface 26 where the maximum temperature appears. As seen in figure 6, the temperature sensor 19 is planned in the area of an edge 27. In the preceding case, the temperature sensor 19 is placed in a recess 25 in the ceramic 18, which adjoins the recess 25 in the main body 14 through which the connection line 19.3 is led outward. The recess 25 in the ceramic 15 is created preferably during the ceramic's green state (before sintering). In addition, the temperature sensor 19 can be placed on any desired position above the section of the drainage element width that is wetted by the fabric.

In both cases depicted in figures 5 and 6, the obtained temperature measurement value is analyzed in the process control system 24 assigned to the paper machine and preferably compared to at least one selectable threshold value. Depending on the result of the analysis or when the selectable threshold value is exceeded, the process control system 24 automatically activates or influences as appropriate at least one control element in order to indicate that the threshold value has been exceeded and/or to initiate at least one appropriate countermeasure that will counteract further heating of the monitored area or cool the monitored area. This allows temperature measurement to be part of a control system that

includes signal conversion (following temperature measurement) and data processing by means of a process control system 24.

List of Reference Symbols

- 1 Machine
- 2 Fibrous web
- 3 Fibrous suspension
- 4 Sheet formation area
- 5 Fabric
- 5.1 Mesh screen
- 6 Suction box
- 7 Main box
- 8 Connection
- 8.1 Line
- 9 Suction source
- 10 Edge zone
- 11 Suction box cover
- 12 Drainage element
- 12.1 Drainage rail
- 12,2, 18.1, 18.2, 18.3 Edge piece
- 13 Suction slit
- 14 Main body (drainage rail)
- 15 Ceramic
- 16 Format slide
- 17 Main body (format slide)
- 18 Ceramic
- 18.1, 18.2, 18.3 Small ceramic plates
- 19, 19.1, 19.2 Temperature sensor
- 19.3 Connection line
- 20 Height adjustment mechanism
- 20.1 Adjustment screw

20.2 Locking screw

21 Intermediate sheet

22 Extension

23 Adhesive point

24 Process control system

25 Recess

26 Ceramic surface

27 Edge

A Distance

H Height

L Machine's running direction (arrow)

M Machine middle

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File: PB11242USK
"Rail Temperature"

5 **Machine for Producing a Fibrous Web from a Fibrous Suspension as well as a
 Process and System for Monitoring a Drainage Element**

Summary

10 The invention is a machine (1) for manufacturing a fibrous web (2) from a fibrous
 suspension (3), with a sheet forming area (4) that exhibits at least one suction box (6),
 which consists of a main box (7) with at least one suction box cover (11) that is formed
 from at least two drainage elements (12) that run laterally to the machine's running
 direction (L), border a suction slit (13), and each consist of one main body (14) and at
15 least one ceramic (15).

 The invention is identified by the fact that at least one drainage element (12) and/or one
 format slide (16) exhibit at least one removable edge piece (12.2, 18.1, 18.2, 18.3) in
 which is integrated at least one temperature sensor (19, 19.1, 19.2) in order to measure
 the temperature in the ceramic (15, 18) and/or the temperature at an adhesive point
20 (23) between the ceramic (15, 18) and the associated main body (14, 17) and/or the
 temperature in the main body (14, 17).

 The invention is furthermore a process and a system for monitoring a drainage element
 (12).

25 (Figure 1)

[figure with reference numbers]

Applicant:

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File: PB11242USK

"Rail Temperature"

**Machine for Producing a Fibrous Web from a
Fibrous Suspension as well as a Process and System
for Monitoring a Drainage Element**

Claims

1. Machine (1) for manufacturing a fibrous web (2), especially a paper, cardboard, or tissue web, from a fibrous suspension (3) with a sheet forming area (4) in which the developing fibrous web (2) is led by means of at least one porous fabric (5), especially a mesh screen (5.1), over at least one suction box (6) that consists of a main box (7) that exhibits at least one connection (8), including a line (8.1), for at least one vacuum source (9) and that consists of at least one suction box covering (11) that is formed by at least two drainage elements (12), especially drainage rails (12.1) that run laterally to the machine's running direction (L), border a suction slit (13) and consist of at least one main body (14) and at least one ceramic (15) each, whereby each of the at least one suction slits (13) in both edge zones () of the fabric (5) is bordered by a format slide that consists of a main body (17) and at least one ceramic (18),
wherein

at least one drainage element (12) and/or one format slide (16) exhibits at least one removable edge piece (12.2, 18.1, 18.2, 18.3) in which at least one temperature sensor (19, 19.1, 19.2) is integrated in order to measure the temperature in the ceramic (15, 18), and/or the temperature at an adhesive point (23) between the ceramic (15, 18) and the associated main body (14, 17), and/or the temperature in the main body (14, 17).

2. Machine (1) according to claim 1,

wherein

the temperature sensor (19, 19.1, 19.2) is placed in the ceramic (15, 18) close to the surface (26) of the ceramic, where the maximum temperature appears, and on any desired position above the section of the width of the drainage element (12) that is wetted with the covering (5).

3. Machine (1) according to claim 1 or 2,

wherein

the temperature sensor (19, 19.1, 19.2) is placed in a recess (25) in the ceramic (15, 18).

4. Machine (1) according to one of the preceding claims,

wherein

one temperature sensor (19, 19.1, 19.2) each is planned at the beginning and/or the end of the drainage element (12) when viewed from the machine's running direction (L).

5. Machine (1) according to one of the preceding claims,

wherein

several temperature sensors (19.1, 19.2) are planned, arranged at a respective distance (A) from each other when viewed laterally to the machine's running direction (L).

6. Machine (1) according to one of the preceding claims,
wherein
the distance (A) between the measurement points is each about 500 mm.

7. Machine (1) according to one of the preceding claims,
wherein
a thermocouple is intended as the temperature sensor (19, 19.1, 19.2).

8. Machine (1) according to one of the preceding claims,
wherein
the main body (14, 17) of the drainage element (12) and/or the format slide (16) consists of a glass fiber reinforced plastic.

9. Machine (1) according to one of the preceding claims,
wherein
the ceramic (15, 18) of the drainage element (12) and/or the format slide (16) takes the shape of a small ceramic plate (18.1, 18.2, 18.3) and exhibits a height (H) in the range of 1 mm to mm, preferably 2 mm to 6 mm.

10. Machine (1) according to one of the preceding claims,
wherein

the format slide (16) can be moved laterally to the machine's running direction (L).

5 11. Machine (1) according to one of the preceding claims,

wherein

the format slide (16) is constructed as a single piece, whereby the slide preferably exhibits a constant height (H).

10 12. Machine (1) according to one of the claims 1 through

wherein

the format slide (16) is constructed from several pieces, whereby the slide preferably exhibits a constant height (H).

15 13. Machine (1) according to claim 11 or 12,

wherein

the format slide (16) is equipped with at least one height adjustment mechanism (20).

20 14. Machine (1) according to claim 13,

wherein

the height adjustment mechanism (20) consists of at least one adjustment screw (20.1) including the associated locking screw (20.2).

25 15. Machine (1) according to one of the preceding claims,

wherein

the format slide (16) exhibits an extension (22) that extends in the direction of the machine middle (M) and preferably comes into contact with the fabric (5).

16. Machine (1) according to claim 15,
wherein
the format slide (16) is permeable for a fluid, such as air or water.
17. Machine (1) according to claim 15 or 17,
wherein
the format slide (16) exhibits a surface profile in contact with the fabric (5) that is very similar to that of the drainage element (12).
18. Machine (1) according to one of the claims 15 through 17,
wherein
the extension (22), when viewed from above, is wedge-shaped.
19. Machine (1) according to one of the claims 15 through 18,
wherein
the extension (22), when viewed from above, is perforated.
20. Process for monitoring a paper machine's drainage element (12) (especially according to one of the claims 1 through 19), which includes at least one ceramic (18), with the following steps:
- a) the temperature in the ceramic (18) and/or the temperature at an adhesive point (23) between the ceramic (18) and an associated main body (14) and/or the temperature in the main body (14) are measured,

- b) the obtained temperature measurement value is analyzed in a process control system (24) assigned to the paper machine and is preferably compared with at least one selectable threshold value,
- 5 c) depending on the result of the analysis or when the selectable threshold value is exceeded, the process control system (24) automatically activates or influences as appropriate at least one control element in order to indicate that the threshold value has been exceeded and/or to initiate at least one appropriate countermeasure that will counteract further heating
- 10 of the monitored area or cool the monitored area.

21. Process according to claim 20,
wherein

15 temperature measurement is part of a control system that also includes signal conversion following the measurement of temperature, as well as data processing performed by the process control system (24).

22. Process according to claim 20 or 21,
wherein

20 the temperature is measured in the ceramic (18) and close to the surface of the ceramic (26) where the maximum temperature appears.

23. Process according to the claims 20 to 22,
wherein

25 a recess (25) is created in the ceramic (18), a temperature sensor (19) is inserted into the recess (25), and the temperature in the ceramic (18) is measured via this temperature sensor (19) that is inserted into the recess (25).

24. Process according to claim 23,
wherein
the recess (25) in the ceramic (18) is created before sintering of the ceramic (18).

25. Process according to claim 24,
wherein
the recess (25) is created during a molding process.

26. Process according to claim 24,
wherein
the recess (25) in the ceramic (18) is created by working the ceramic (18) after
the ceramic has already been sintered.

27. Process according to one of the claims 20 to 26,
wherein
at least one of the following countermeasures is initiated if a respective threshold
value is exceeded:

- a) reduction of the speed of the mesh screen, preferably to standstill,
- b) particularly slow increase of the rinse water volume,
- c) reduction of the vacuum on the drainage element (12).

28. Process according to one of the claims 20 to 27,
wherein
at least one spray tube is appropriately influenced to change the flow rate of the
spray water.

34. Process according to one of the claims 20 to 33,
wherein

the temperature is measured, viewed from the machine's running direction, at the
beginning and/or end of the drainage element (12).

35. Process according to one of the claims 20 to 34,
wherein

the temperature is measured, viewed laterally to the machine's running direction,
at several points that are separated from each other by an appropriate distance.

36. Process according to claim 35 **wherein** the distance between the measurement
points is about 500 mm.

37. Process according to one of the claims 20 to 36,
wherein

a thermocouple (19) is used as the temperature sensor.

38. Process according to one of the claims 20 to 37,
wherein

the drainage element (12) includes at least one ceramic rail (12.3) and/or
something equal.

39. System for monitoring a paper machine's
drainage element (12) with a ceramic (18), especially according to one of the
claims 1 through 19, with at least one temperature sensor (19), which is
connected to a process control system (24) assigned to the paper machine in
order to measure the temperature in the ceramic (18) and/or the temperature at

an adhesive point (23) between the ceramic (18) and an associated main body (14) and/or the temperature in the main body (14), whereby the obtained
5 temperature is analyzed in the process control system (24) and preferably compared with at least one selectable threshold value and, depending on the result of the analysis or if the selectable threshold value is exceeded, the process control system (24) automatically activates or can influence at least one control
10 element in order to signal that the threshold value has been exceeded and/or to initiate at least one appropriate countermeasure with which further warming of the monitored area will be counteracted or the monitored area will be cooled.

40. Monitoring system according to claim 39,
wherein

15 the temperature sensor (19) is part of a control system that also includes signal conversion following temperature measurement as well as data processing performed by means of the process control system (24).

41. Monitoring system according to claim 39 or 40,
wherein

20 the temperature sensor (19) is placed in the ceramic (18) and close to the surface of the ceramic (26) where the maximum temperature appears.

42. Monitoring system according to one of the claims 39 to 41,
wherein

25 the temperature sensor (19) is placed in a recess (25) in the ceramic (18).

43. Monitoring system according to one of the claims 39 to 42,
wherein

the process control system (24) is designed in such a way that, in the event that
a respective threshold value is exceeded, at least one of the following
countermeasures will be initiated:

- a) reduction of the speed of the screen mesh, preferably to standstill,
- b) particularly slow increase of the rinse water volume,
- c) reduction of the vacuum on the drainage element (12).

44. Monitoring system according to one of the claims 39 to 43,
wherein

at least one spray tube can be properly influenced by means of the process
control system (24) in order to change the spray water flow rate.

45. Monitoring system according to one of the claims 39 to 44,
wherein

at least one of the paper machine's drives can be appropriately influenced by
means of the process control system (24) in order to change the speed of the
paper machine.

46. Monitoring system according to one of the claims 39 to 45,
wherein

at least one valve can be appropriately adjusted by means of the process control
system (24) in order to reduce the vacuum on the drainage element (12).

47. Monitoring system according to one of the claims 39 to 46,

wherein

at least one tension roller can be appropriately adjusted by means of the process control system (24) in order to reduce the wire tension.

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48. Monitoring system according to one of the claims 39 to 47,

wherein

an alarm signal can be emitted by means of the process control system (24) if a corresponding threshold value is exceeded.

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49. Monitoring system according to one of the claims 39 to 48,

wherein

in the event that an initial threshold value is exceeded, first a warning signal can be generated by means of the process control system (24) and, when another threshold value is exceeded, at least one corresponding countermeasures can be initiated with which further warming of the monitored area is counteracted or the monitored area is cooled.

15

50. Monitoring system according to one of the claims 39 to 49,

wherein

one temperature sensor (19) each is planned at the beginning and/or the end of the drainage element (12) when viewed from the machine's running direction.

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51. Monitoring system according to one of the claims 39 to 50,

wherein

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several temperature sensors (19) are planned at a respective distance from each other when viewed laterally to the machine's running direction.

5 52. Monitoring system according to claim 51,
 wherein
 the distance between the measurement points is about 500 mm.

10 53. Monitoring system according to one of the claims 39 to 52,
 wherein
 a thermocouple (19) is planned as the temperature sensor.

15 54. Monitoring system according to one of the claims 39 to 53,
 wherein
 the drainage element (12) includes at least one ceramic rail (12.3) and/or
 something equal.

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Figure 1

Figure 2a

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Figure 2b

Figure 3a

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Figure 3b

Figure 4